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I, LEANNE MYNOTT, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. PP 9044 for a patent by CMI MALCO PTY LTD filed on 08 March 1999.



WITNESS my hand this
Seventeenth day of March 2000

L. Mynt

LEANNE MYNOTT
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CMI MALCO PTY LTD

AUSTRALIA
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PROVISIONAL SPECIFICATION

Invention Title: A SCREENING APPARATUS

This invention is described in the following statement:

This invention relates generally to an apparatus for screening, separating or grading materials. In particular the invention relates to a system for fixing screen panels to a support frame of such an apparatus.

5 Various systems have been developed for fixing screen panels to a support frame which allows individual panels to be removed and replaced when worn.

Screening apparatus of this type have consisted of metal screens. When such screens have become worn they are removed, discarded and replaced with new metal screens. The worn screens were not recycled but
10 were simply thrown away.

Australian patent specification 11425/95 is representative of such an apparatus.

Screens made from a composite material such as plastic (and in particular polyurethane) reinforced with metal are also known. Such screens
15 had a rigidity of that approaching metal screens and when worn, were simply discarded. Composite screens could not be easily recycled as scrap for re-use.

Screens made entirely of plastic (usually polyurethane) have also been suggested. Such screens were able to be recycled when worn and the
20 raw material from which they were manufactured was able to be re-used. Plastic screens by their very nature were flexible and unless adequately supported and mounted in the apparatus were able to flex. When screens of that sort flexed the openings through the screen became distorted and the screen would allow larger particles than intended to pass through the screen.

25 Generally known plastic screens were secured in position employing a large number of fixing components and this made it difficult and time consuming to remove and replace worn screens.

Australian patent specification 700843 discloses a system for fixing screens to a deck frame. The fixing system employs retaining strips and a
30 cover strip which was positioned above the screens and the cover was exposed to the material deposited onto the screen and not only obstructed the flow of material across and through the screens but was also prone to wear.

Australian patent specifications 62147/96, 654091 and 11425/95 show cover strips located above the screens and are subject to the same disadvantages as the arrangement of specification 700843.

It is an object of the invention to provide an apparatus for screening
5 which at least minimises some of the disadvantages referred to above.

According to one aspect the invention provides an apparatus for screening including a deck support frame, a plurality of screen support frames releasably secured to the deck frame by fasteners, support rails extending along and across the screen support frame, and a plurality of
10 screens, the screens having locking formations extending along and across an underside thereof and the support rails having complementary locking formations for engagement with the locking formations on the underside of the screens for removably mounting the screens relative to the screen support frame.

15 The screens may be of a size and shape corresponding to that of the screen support frame and each screen support frame may receive a single screen. Alternatively, the screens may be of a size and shape smaller than the screen support frames and in which case each support frame may receive a plurality of screens. It is preferred that each support frame receive two
20 screens of identical size and shape.

The screens may be made entirely of plastics material. Although polyurethane is the preferred plastics material, other plastics materials are not excluded. The screens may be made of a combination of materials rather than entirely of plastics. If the screens are made entirely of plastics, worn
25 screens may readily be removed from the screen supports and recycled. Where the screens are made from combinations of material it is preferred that the portions of the screen which provide the locking formations on the screens be made of plastics material and the remainder of the screens may be made of metal. The portions which provide the locking formations may be
30 releasably secured to the remainder of the screen typically by an adhesive although they may be fastened in any other convenient way.

Where the screens are made of combinations of materials as described above, the parts of the screens may be separately recycled.

The screens and screen support frames, as mentioned, have complementary locking formations. It is preferred that these formations consist of locking recesses and projections. The projections are preferably on the screen support frames and the recesses are provided in the screens
5 although the reverse of this may also be the case.

The projections on the screen support frames may extend around the periphery of the frame as well as across the frame.

Preferably the projections extend from an upper part of the screen support frames. The projections may have an enlarged head or bead
10 extending along an edge thereof.

The recesses in the screens may be present as grooves extending around the periphery of the screens and preferably also across the screens. The grooves may have an enlarged inner profile for releasably received the enlarged head of the projections on the screen support frames.

15 Preferred embodiment of the invention will now be described by way of example with reference to the drawings in which:

Figure 1 is an exploded view of an apparatus for screening according to an embodiment of the invention.

Figure 2 is a plan view of the apparatus according to one embodiment
20 of the invention;

Figure 3 is an exploded sectional view taken along line III - III of Figure 2;

Figure 4 is an assembled perspective view of the apparatus shown in Figure 3;

25 Figure 5 is an exploded perspective view of the apparatus of Figure 4;

Figure 6 is a plan view of the apparatus according to another embodiment of the invention;

Figure 7 is an exploded sectional view taken along line VII - VIII in Figure 6.

30 Figure 8 is an assembled perspective view of the apparatus shown in Figure 7;

Figure 9 is an exploded perspective view of the apparatus of Figure 8;

Figure 10 is an exploded fragmentary enlarged view of detail which

aids the understanding of Figures 1 to 9; and

Figure 11 is a further exploded fragmentary enlarged view of detail which aids the understanding of Figures 1 to 9.

Figure 1 shows detail of a screening apparatus 15. The apparatus 15 has a deck support frame 16 which, in use, forms part of a vibrating screening apparatus. The frame 16 has frame members 17, 18, 19 arranged parallel to one another and connected to each other by frame members 20, 21. Support rails 21a, 21b extend across the frame and have apertures for receiving fasteners 22. The fasteners 22 are used to secure screen support frames 23 to the members 20, 21 and relative to the deck support frame 16.

In this embodiment plastic screens 30, typically made of polyurethane (although other plastics are not excluded) are releasably mounted relative to the screen support frames in a manner described below. Each screen support frame 23 in this embodiment receives two screens 30. A respective side clamp bar 31 locates relative to sides of the screen located along opposed edges of the apparatus 15. Only one of the bars 31 is shown. The bar 31 has tabs 32 at locations along its length and the tabs locate relative to recesses in the screen support frames.

Figures 6 to 9 show further detail of the mats 30, screen support frame 23 and fasteners 22. In Figures 8 and 9 the mats 30 are shown incomplete and not all of the upper surface of the screens have screen openings shown. As shown in Figure 9 the screen support frame 23 is provided with a lip 33 extending around its periphery and beads 34 extending across the frame 23. The lip 33 and the beads 34 have enlarged outer end portions adopted to engage recesses in the underside of the screens 30 to allow the mats to be releasably secured to the frame 23.

Figures 2 to 5 show details of an alternative embodiment to that illustrated in Figure 1 and Figures 6 to 9 of the drawings. In Figures 2 to 5 like numerals are used for like parts shown in Figures 6 to 9. In figures 2 to 5 a screen 40 is shown which is twice the size of a mat 30 of the other figures. Once again the upper surface of screen 40 has some of the detail of the screen openings omitted from its upper surface.

Figure 10 shows an exploded view of a screen 50, fastener 22 and

support frame 23. As shown in Figures 5 and 9 the support frame has part circular recesses 51 with a shoulder 52 against which the underside of the head 53 of the fastener 22 rests when it is positioned relative to the frame 23.

Part circular extension 54 projects from the underside of the frame 23 and extend through the apertures in the members 20, 21. Two extensions 54 together provide a sleeve through which the fasteners 22 extend. The shank 55 of each fastener 22 are partially threaded and the threaded portion extends through the apertures in members 20, 21 and bolts screwed onto the thread portion to clamp the support frame in position.

10 The support frame 25 has a peripheral lip 33 which matches a recess 56 provided along edges of the screen 30 or screen 40.

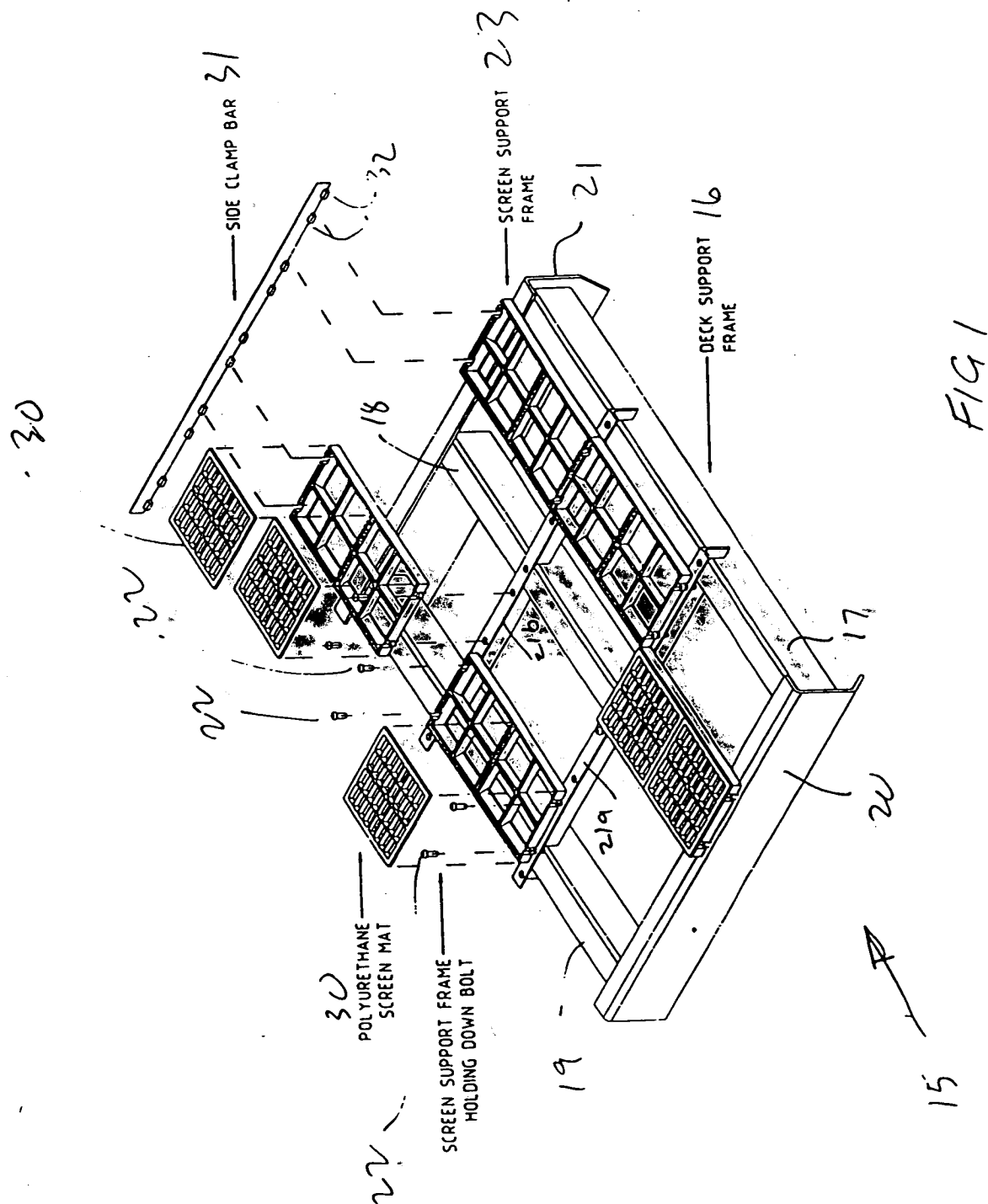
Figure 11 is an exploded detailed view of an intermediate part of either a screen 30 or a screen 40 and a support frame 23. Beads 34 extend across the frame 23 and terminate in an enlarged head 57. The screens 30 and 40 have cross members 58 with a recess 59 formed in an underside thereof. The recesses 59 are of a complementary shape to the heads 57. In this way the screens may be releasably snap fitted to the support frame 23 and may easily be removed therefrom once they are worn. If desired, where all the screens on a screening apparatus do not wear evenly during service, the screens may be removed and replaced in different locations on the support frame and re-used on the apparatus.

DATED THIS 8TH DAY OF MARCH 1999

CMI MALCO PTY LTD

BY THEIR PATENT ATTORNEYS

CULLEN & CO.



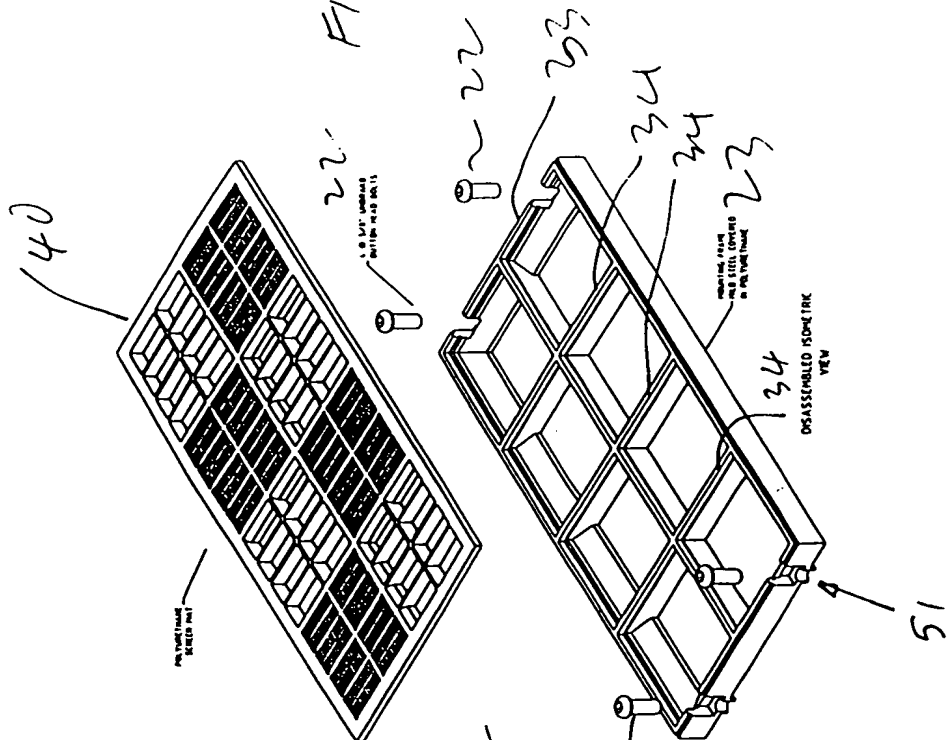
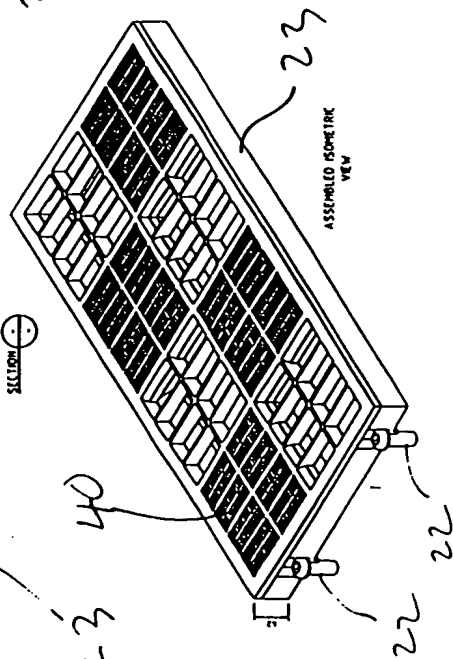
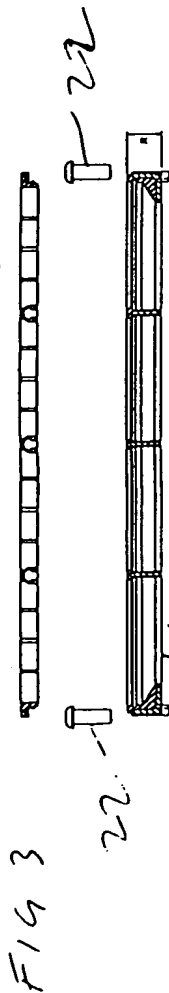
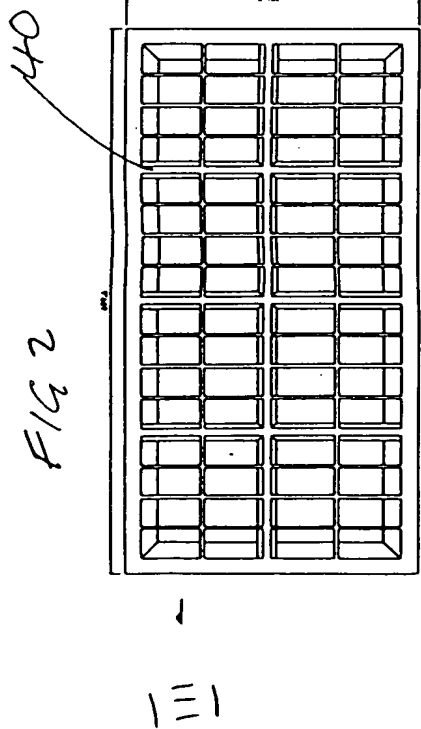


FIG 6

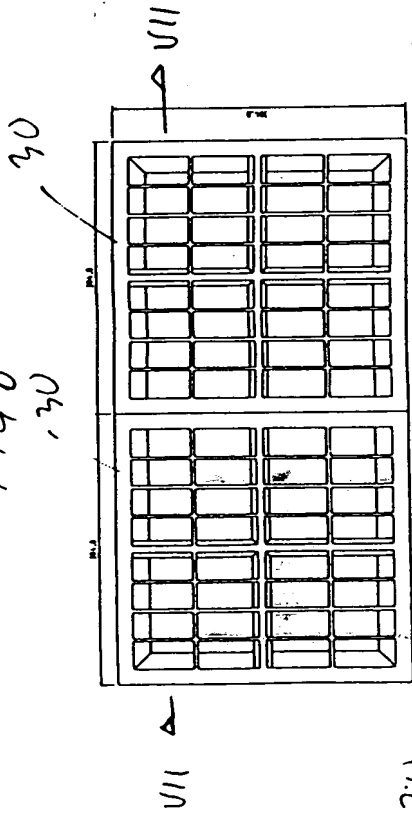


FIG 7

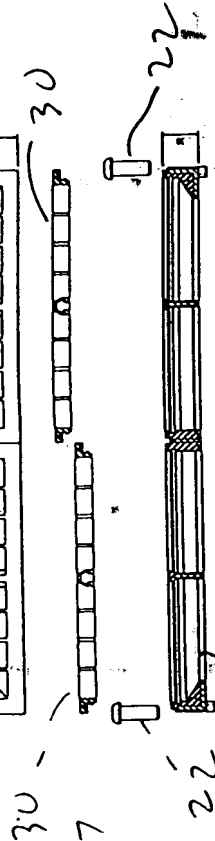


FIG 9

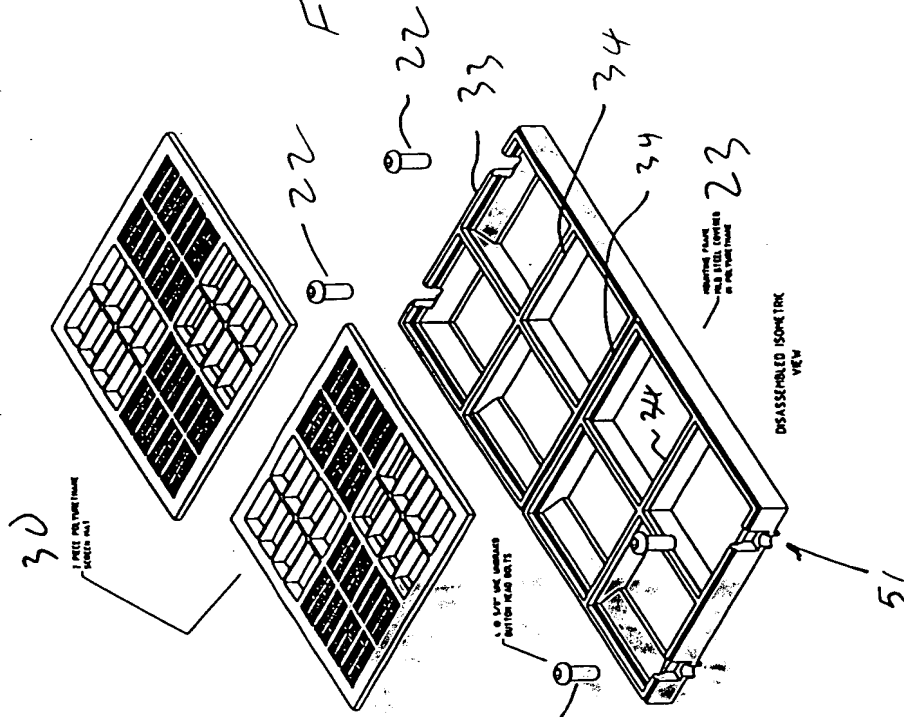
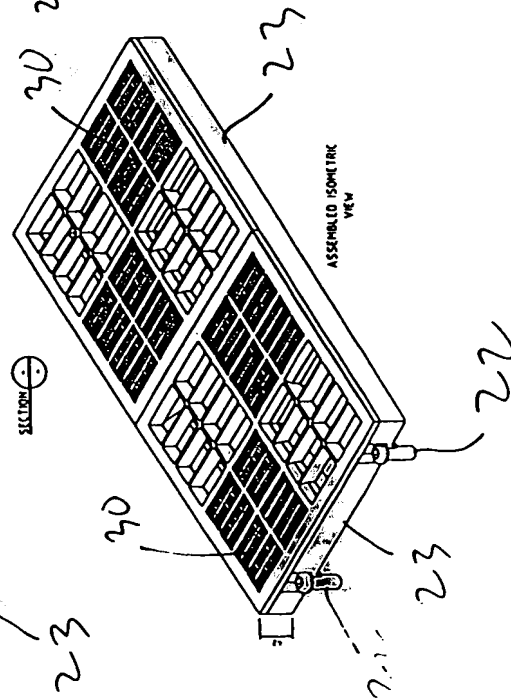
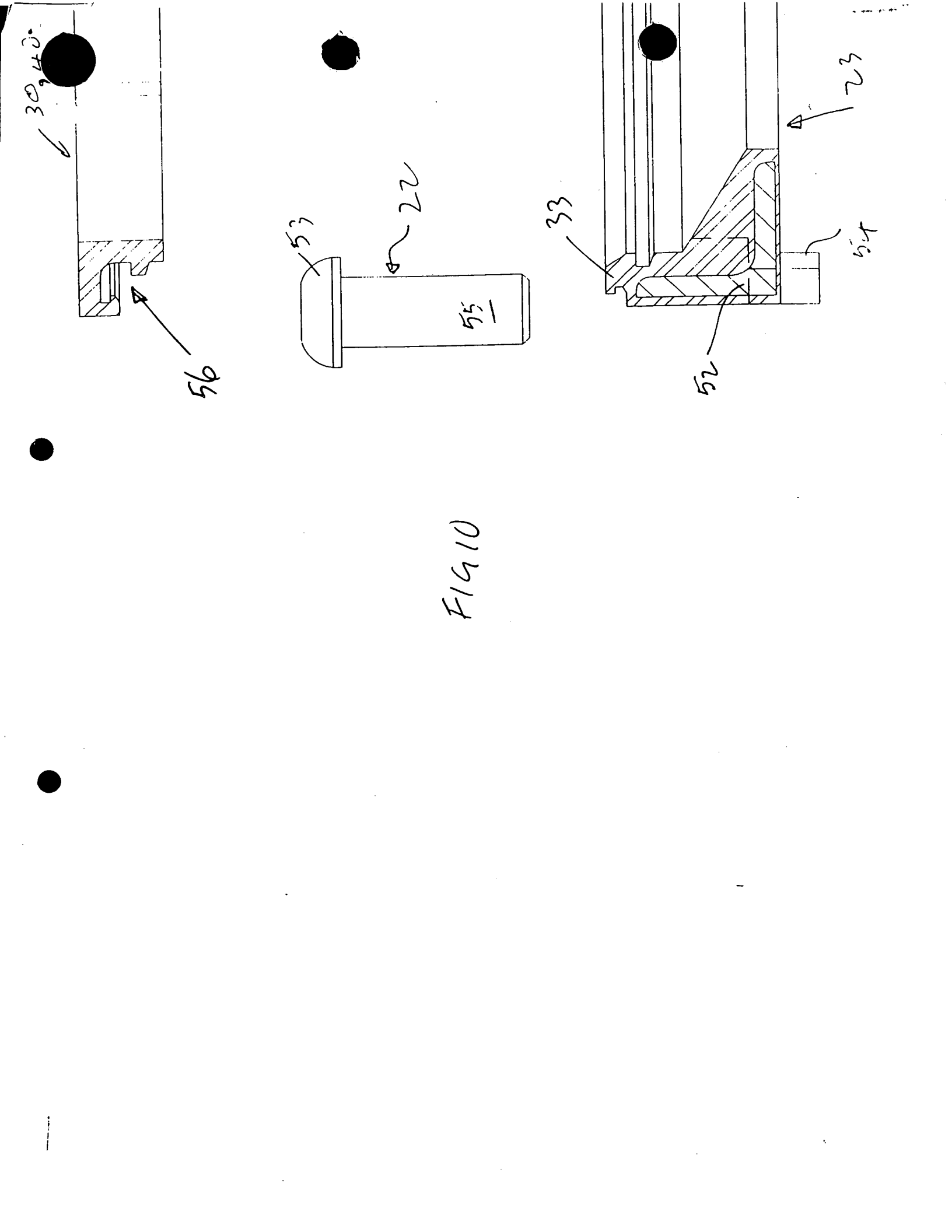


FIG 8





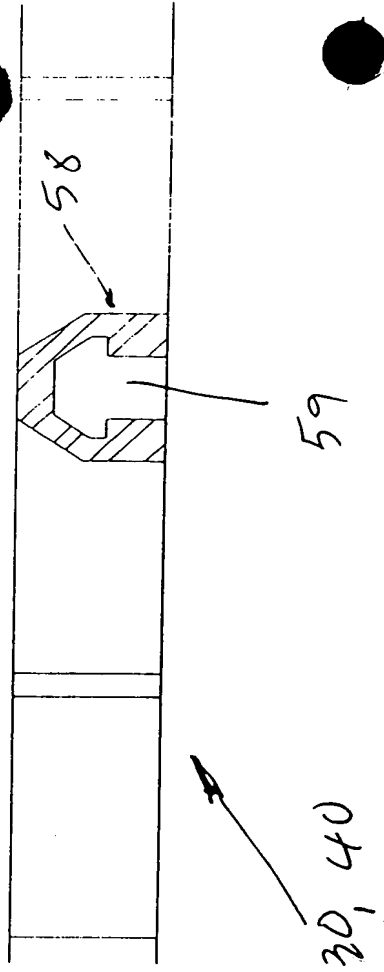
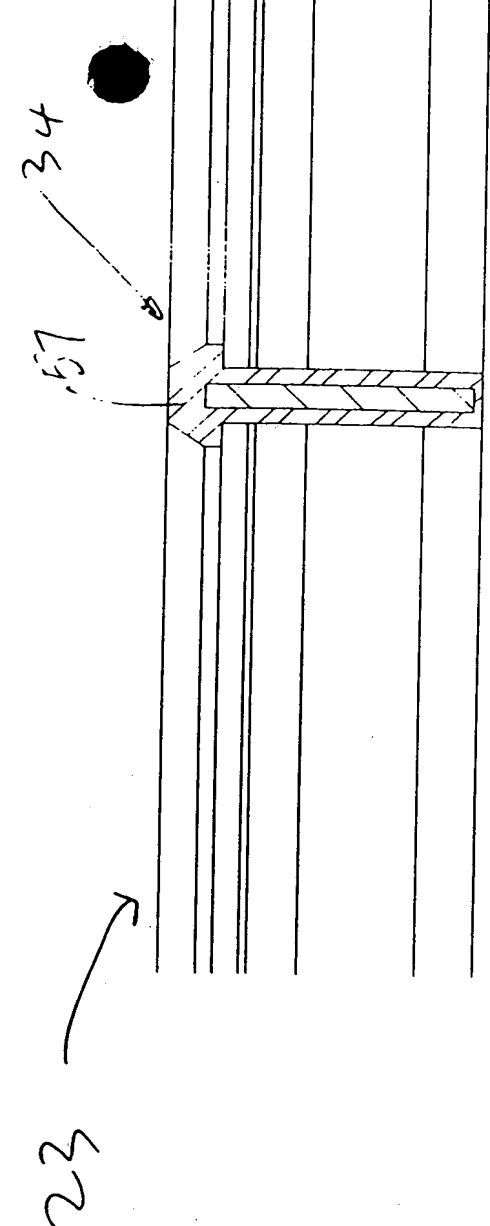


FIG 11



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